

**Remarks**

Upon entry of the present Reply, claims 1-22 are pending in the present application.

Claim 1 is amended herein to make clear that the sought product is a high density circuit carrier, that the printed circuit board provided to the process in (a) already contains circuit traces on at least one side thereof, that the dielectric formed is over the circuit traces, that the trenches do not extend completely through the dielectric while the vias do extend through the dielectric to the circuit carrier. This amendment is supported in the application and drawings as originally filed; see, e.g., p. 26, lines 7-14 and p. 27, lines 6-14 of the PCT application WO 2005/076681.

**Rejections of Claims over Tamm et al. in view of Tsushima.**

All of the pending claims stand rejected as obvious over Tamm et al., US 5666722 in view of Tsushima, US 2004/0086806, in one case (claim 16) further in view of Konrad et al., US 2002/0129972, and in one case (claim 17), further in view of Yokogawa, US 6740416. Applicant respectfully traverses these rejections of the claims, and requests reconsideration and withdrawal of said rejections, for at least the following reasons.

Applicants respectfully submit that the basic combination of Tamm et al. and Tsushima fails to disclose or suggest all of the features of claim 1 of the present application. Accordingly, there is no basis for a *prima facie* case of obviousness, and the rejections of Applicants' claims should be withdrawn.

The Office Action contends that Tamm et al. discloses providing a printed circuit board 20 (Fig. 3a, *sic*, Fig. 2a), coating the circuit board on at least one side thereof with a dielectric 21 and 22 (Fig. 2a) to form a dielectric layer, structuring the dielectric layer for producing trenches 24, 25 and 26 and vias 23a using laser ablation, followed by depositing a metal layer onto the trenches and vias and completely filling the same, and removing the metal layer and primer layer except for the trenches and vias, to expose the dielectric layer, as claimed.

The Office Action admitted that Tamm fails to show the trenches not extending completely through the dielectric layer and depositing a primer layer into the produced trenches and vias only.

The Office action cited Tsushima for allegedly teaching structuring the dielectric for producing a trenches using laser ablation, the trenches not extending completely through the dielectric and depositing a primer layer into the produced trenches.

The present invention begins with a printed circuit board having circuit traces on at least one side thereof, and forms a further dielectric layer over the circuit traces, then structures the dielectric layer to produce trenches and vias, in which the trenches do not extend all the way through the dielectric layer to the circuit traces but in which the vias do extend all the way through the dielectric to the circuit traces.

The asserted prior art fails to disclose or suggest the claimed process operating upon the specified substrate, i.e., a printed circuit board having circuit traces on at least one side thereof, and carrying out the steps of the process in accordance with the present invention.

Applicants respectfully note that Tamm et al. does not teach starting the process with a printed circuit board at all, and does not teach a printed circuit board having circuit traces on at least one side thereof. The structure shown in Figs. 2a and 3a is a layer of a dielectric (20, 30) covered on each side with additional layers of dielectric (21, 22 and 31, 32, respectively). This is nothing more than multiple layers of dielectric that may eventually be converted to a printed circuit board, but it is most certainly not a printed circuit board and does not have any circuit traces on either side. The Tamm et al. process forms such circuit traces on the dielectric layers, but does not form dielectric layers over any circuit traces.

For this reason alone, the Office Action fails to state a *prima facie* case of obviousness, because Tamm et al. fails to disclose a printed circuit board having circuit traces on at least one side thereof.

Tsushima fails to remedy the shortcomings of Tamm et al. Tsushima fails to teach forming trenches and vias in a printed circuit board having circuit traces on at least one side thereof. Tsushima teaches various substrates in [0080], none of which are a printed circuit board having circuit traces on at least one side thereof.

Tsushima also fails to teach use of laser ablation to form the trenches and vias, contrary to the assertion in the Office Action mailed 12 November 2009 at page 3 in the discussion of Tsushima. Rather, Tsushima teaches formation of trenches and vias in the substrate layers (which layers do not contain any circuit trace) by use of UV light to expose and cause a photosensitive resin to react, followed by chemical etching.

For these additional reasons, combination of Tsushima with Tamm et al. would not have rendered obvious the presently claimed invention.

Hence, the present claims recite starting the process with a printed circuit board. This offers the advantage that it will be possible to achieve the high density circuit carrier more easily and directly.

For the foregoing reasons, Applicant respectfully submits that the presently claimed invention would not have been obvious over the asserted combination of prior art references. Accordingly, Applicant respectfully requests reconsideration of the application, withdrawal of all rejections of the claims, and allowance of the presently pending claims. Notice to such effect is respectfully requested.

### **CONCLUSION**

Claims 1-22 are believed to be in condition for allowance. Notice to such effect is respectfully requested.

In the event any issues remain in the application, or if the Examiner considers that a telephone interview would facilitate the examination process, Applicant's undersigned attorney invites the Examiner to telephone him at the Examiner's convenience.

In the event any additional fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 under Attorney Docket No. **EFFE0101US**.

Respectfully submitted,

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